A Convenient Synthesis of 2-Arylidene-5*H*-thiazolo[2,3-*b*]quinazoline-3,5[2*H*]-diones and Their Benzoquinazoline Derivatives

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Various 5*H*-thiazolo[2,3-*b*]quinazoline-3,5[2*H*]-diones (**7a,b**), 2-arylidene-5*H*-thiazolo[2,3-*b*]quinazoline-3,5[2*H*]-diones (**9a-o**) and 2-arylidene-5*H*-thiazolo[2,3-*b*]benzoquinazoline-3,5[2*H*]-diones (**12a,b**) have been synthesized *via* simple and efficient methods.

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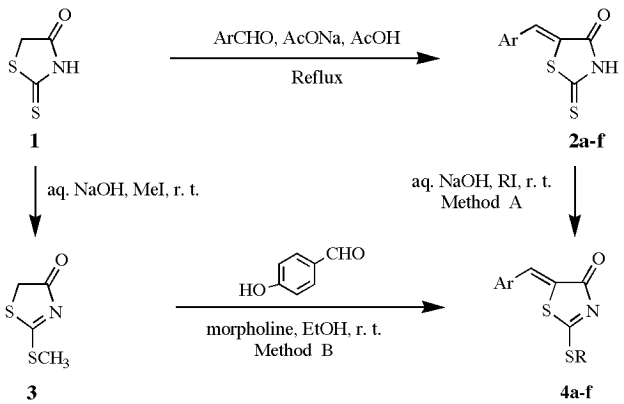
A number of polycyclic fused ring compounds possessing the quinazoline ring system display a wide range of biological properties, including antihypertensive [1,2], antiinflammatory [3], antifungal [4], antimelanoma, anticarcinoma [5], antiplatelet [6], antimetabolites [7], antibacterials [8,9], antimalarials [10] activity, antiviral against influenza virus [11], and α_1-adrenoceptor antagonists [12,13]. In this respect, it seemed worth-while to condense the quinazolone nucleus with the chemotherapeutically active nucleus thiazole [14,15] from the readily accessible thiazolinone thiones. The importance of such compounds as intermediate for the synthesis of the biologically active polycyclic fused ring systems [16] prompted our interest in the synthesis and the chemistry of this class of compounds. Chaurasia and Sharma [17] reported the synthesis of 7,9-disubstituted 2-benzylidene-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**9j,l**) from 2-thioureidobenzoic acid in several steps and moderate yields (42-69%). Also Daboun and Abdel Aziz [18] reported the synthesis of **9a,b** from 5-arylidene-2-ethylmercapto-2-thiazolin-4-ones and anthranilic acid. The present work describes the convenient synthesis of a series of 2-(4-oxothiazolidin-2-ylideneamino)benzoic acids (**6a,b**), 2-(5-arylidene-4-oxo-thiazolidin-2-ylideneamino)benzoic acids (**8a-o**) and 3-(5-arylidene-4-oxo-thiazolidin-2-ylideneamino)naphthalene-2-carboxylic acids (**11a,b**), which in turn were cyclized to afford 5*H*-thiazolo[2,3-*b*]quinazoline-3,5[2*H*]-diones (**7a,b**), 2-arylidene-5*H*-thiazolo-[2,3-*b*]quinazoline-3,5[2*H*]-diones (**9a-o**) and 2-arylidene-5*H*-thiazolo-[2,3-*b*]benzoquinazoline-3,5[2*H*]-diones (**12a,b**), respectively *via* simple and efficient methods.

2-Thioxo-4-thiazolidinone (**1**) was condensed with the appropriate aromatic aldehydes to afford the corresponding 5-((*Z*)-arylidene)-2-thioxo-4-thiazolidinones (**2a-f**). Upon alkylation of **1** and **2a-f** gave 2-methylmercapto-4-thiazolidinone (**3**) and 5-((*Z*)-arylidene)-2-alkylmercapto-4-thiazolidinones (**4a-f**), respectively. Compound **4c** was also independently synthesised, through another pathway, *via* the condensation of **3** with 4-hydroxybenzaldehyde in the presence of morpholine in anhydrous ethanol at room temperature. The structures of **2-4** were confirmed on the bases of elemental analysis and spectral data (ir, ^{1}H nmr, ^{13}C nmr and ms). The ir absorption spectrum of compound **2c** was characterised by the presence of signals for NH, CO and CS groups at 3194, 1727 and 1228 cm^{-1}, respectively. The ^{1}H nmr (DMSO-d_6) spectrum of compound **2c** showed a singlet at δ 7.56 ppm assigned to the vinyl proton, indicating the presence of a *Z*-configuration for the exocyclic double bond. This is in agreement with the ^{1}H nmr (DMSO-d_6) spectrum of 5-((*Z*)-(2-pyridylmethylene)-2-thioxo-4-thiazolidinone whose vinyl proton appears at δ 7.70 ppm [19]. The ^{13}C nmr (DMSO-d_6) spectrum of compound **2c** showed signals at δ 121.19, 169.70 and 195.69 ppm assigned to the vinyl, the carbonyl and the thiocarbonyl carbons, respectively indicating the presence of a *Z*-configuration for the exocyclic double bond. This is in agreement with the ^{13}C nmr (DMSO-d_6) spectrum of 5-((*Z*)-(2-pyridylmethylene)-2-thioxo-4-thiazolidinone whose vinyl, carbonyl and thiocarbonyl carbons respectively appear at δ 124.66, 170.05 and 202.66 ppm (Scheme 1).

Scheme 1



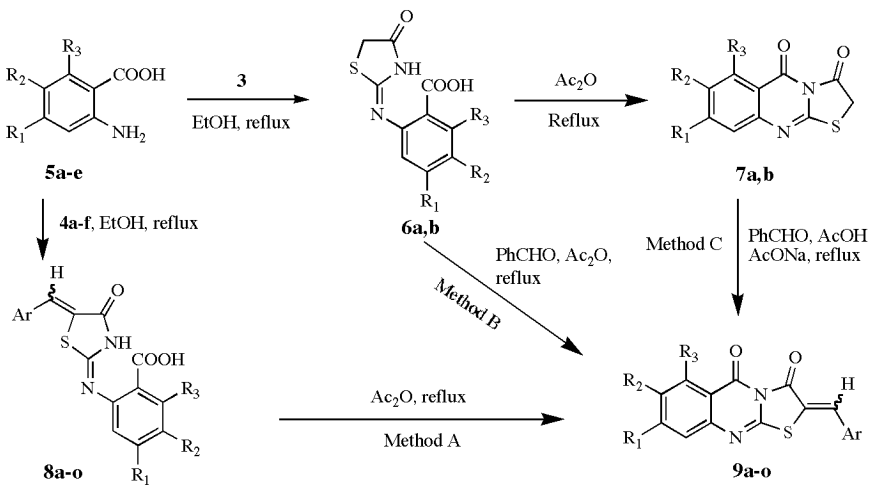
2-4	Ar	R	2-4	Ar	R
a	C_6H_5	allyl	**d**	2-HO,3-$MeOC_6H_3$	Me
b	4-$MeOC_6H_4$	allyl	**e**	2-thienyl	allyl
c	4-HOC_6H_4	Me	**f**	2-furyl	allyl

It was planned to synthesize 2-(4-oxo-thiazolidin-2-ylideneamino)benzoic acids (**6a,b**) and 2-(5-arylidene-4-oxo-thiazolidin-2-ylideneamino)benzoic acids (**8a-o**) *via* the condensation of **3** and **4a-f** with 2-aminobenzoic acid

derivatives (**5a-e**) in refluxing ethanol, which in turn were cyclized by heating in refluxing acetic anhydride to afford the corresponding 5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-diones (**7a,b**) and 2-arylidene-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-diones (**9a-o**), respectively. Compound **9a** was also independently synthesized through another pathway *via* the reaction of **6a** with benzaldehyde in refluxing acetic anhydride and **7a** with benzaldehyde in the presence of anhydrous sodium acetate in refluxing glacial acetic acid, respectively. The structures of **6-9** were confirmed on the bases of elemental analysis and spectral data (ir, ^{1}H nmr, ^{13}C nmr and ms). The ir absorption spectrum of compound **8m** was characterised by the presence of signals for NH, COOH and CO groups at 3282, 1779 and 1717 cm^{-1}, respectively. While the ir absorption spectrum of compound **9d** was characterised by the absence of signals for NH, COOH and the presence of signals for the acetoxy and the carbonyl groups at 1752, 1712 and 1682 cm^{-1}, respectively. The ^{1}H nmr spectrum of compound **8m** showed a singlet at δ 12.67 ppm assigned to the NH group, indicating the presence of the open-form structure. While the ^{1}H NMR spectrum of compound **9d** showed a singlet at δ 2.38 ppm assigned to the acetoxy group and the absence of signal for NH group, indicating the presence of the closed-form structure (Scheme 2).

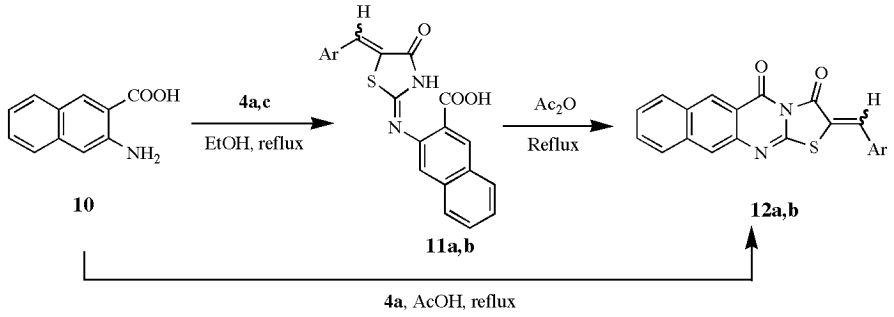
In a similar manner the synthesis of 3-(5-arylidene-4-oxo-thiazolidin-2-ylideneamino)naphthalene-2-carboxylic acids (**11a,b**) were performed. Thus, when 5-arylidene-2-alkylmercapto-4-thiazolidinones (**4a,c**) were treated with 3-amino-2-naphthoic acid (**10**) in refluxing ethanol, **11a,b** were obtained, which in turn were cyclized by refluxing in acetic anhydride to afford the corresponding 2-arylidene-5*H*-thiazolo[2,3-*b*]benzoquinazoline-3,5(2*H*)-diones (**12a,b**). Compounds **12a** were also independently synthesized through another pathway *via* the reaction of **4a** with **10** in refluxing glacial acetic acid (Scheme 3).

Scheme 2



5-7	Ar	R_1	R_2	R_3		Ar	R_1	R_2	R_3
a		H	H	H	**n**	2-furyl	H	Cl	H
b		OMe	Ome	H	**o**	2-thienyl	H	H	Cl
c		H	Br	H	**9a**	C_6H_5	H	H	H
d		H	Cl	H	**b**	4-$MeOC_6H_4$	H	H	H
e		H	H	Cl	**c**	4-$AcOC_6H_4$	H	H	H
8a	C_6H_5	H	H	H	**d**	2-AcO,3-$MeOC_6H_3$	H	H	H
b	4-$MeOC_6H_4$	H	H	H	**e**	2-thienyl	H	H	H
c	4-HOC_6H_4	H	H	H	**f**	2-furyl	H	H	H
d	2-HO,3-$MeOC_6H_3$	H	H	H	**g**	4-$MeOC_6H_4$	OMe	OMe	H
e	2-thienyl	H	H	H	**h**	2-AcO,3-$MeOC_6H_3$	OMe	Ome	H
f	2-furyl	H	H	H	**I**	2-thienyl	OMe	OMe	H
g	4-$MeOC_6H_4$	OMe	Ome	H	**j**	C_6H_5	H	Br	H
h	2-HO,3-$MeOC_6H_3$	OMe	Ome	H	**k**	2-furyl	H	Br	H
i	2-thienyl	OMe	Ome	H	**l**	C_6H_5	H	Cl	H
j	C_6H_5	H	Br	H	**m**	4-$MeOC_6H_4$	H	Cl	H
k	2-furyl	H	Br	H	**n**	2-furyl	H	Cl	H
l	C_6H_5	H	Cl	H	**o**	2-thienyl	H	H	Cl
m	4-$MeOC_6H_4$	H	Cl	H					

Scheme 3



	Ar		Ar
11a	C_6H_5	**12a**	C_6H_5
b	2-HO,3-MeOC_6H_3	**b**	2-AcO,3-MeOC_6H_3

In conclusion, we have described the successful synthesis of a series of 5*H*-thiazolo[2,3-*b*]quinazoline-3,5[2*H*]-diones (**7a,b**), 2-arylidene-5*H*-thiazolo[2,3-*b*]quinazoline-3,5[2*H*]-diones (**9a-o**) and 2-arylidene-5*H*-thiazolo-[2,3-*b*]benzoquinazoline-3,5[2*H*]-diones (**12a,b**), respectively *via* simple and efficient methods. The antiviral and the antitumor activities of the new prepared compounds are under biological evaluation studies.

EXPERIMENTAL

Melting points (°C, uncorrected) were recorded on a Gallenkamp melting point apparatus. Aluminium sheets coated with silica gel 60 F_{254} (Merck) were used for TLC, where detection was effected by viewing under a short wavelength UV lamp. IR spectra (potassium bromide disc) were obtained on a Pye Unicam Spectra 1000. Analytical data were performed on C,H,N, Elemental analyser Carlo Erba 1106. ^{1}H nmr and ^{13}C nmr spectra were measured on a Bruker Advance DPX 300 MHz spectrometer for solutions in DMSO-d_6 and deuteriochloroform using TMS as internal standard. The chemical shifts are given as δ values and the *J* values are given in Hz. Mass spectra were recorded on a Varian MAT 112 spectrometer.

5-((*Z*)-Arylidene)-2-thioxo-4-thiazolidinones (**2a-f**).

To a mixture of 2-thioxo-4-thiazolidinone (**1**) (1.33 g, 10 mmol), anhydrous sodium acetate and glacial acetic acid (15 mL) was added the appropriate aromatic aldehydes (11 mmol). The mixture was heated under reflux until the starting material was consumed (3 h; tlc). After cooling to room temperature, the reaction mixture was poured into cold water. The yellow solid that separated was collected by filtration and recrystallized from ethanol to give the products **2a-f**.

5-((*Z*)-Benzylidene)-2-thioxo-4-thiazolidinone (**2a**).

This compound has mp 208-210 °C; yield 2.10 g (95%); (lit [20] mp 204-206 °C, yield 90%); ir: NH 3190, CO 1726, CS 1230 cm^{-1}; ^{1}H nmr (DMSO-d_6): δ 7.49-7.59 (m, 5H, Ar-H), 7.62 (s, 1H, =CH), 13.85 (s, 1H, NH); ^{13}C nmr (DMSO-d_6): δ 125.90 (=CH), 129.84, 130.90, 131.14, 132.05, 133.36 (C-5, C-Ar), 169.76 (C-4), 196.07 (C-2); EI ms, *m/z* = 221 (M^+).

5-((*Z*)-4-Methoxylbenzylidene)-2-thioxo-4-thiazolidinone (**2b**).

This compound has mp 257-259 °C; yield 2.41 g (96%); (lit [21] mp 250-251 °C, yield 80%); ir: NH 3192, CO 1728, CS 1225 cm^{-1}; ^{1}H nmr (DMSO-d_6): δ 3.84 (s, 3H, OMe), 7.14, 7.60 (2d, *J* = 8.8 Hz, 4H, Ar-H), 7.63 (s, 1H, =CH), 13.76 (s, 1H, NH); ^{13}C nmr (DMSO-d_6): δ 55.75 (OMe), 122.41 (=CH), 115.26, 125.65, 132.06, 132.90, 161.52 (C-5, C-Ar), 169.76 (C-4), 196.07 (C-2); EI ms: *m/z* = 251 (M^+).

5-((*Z*)-4-Hydroxybenzylidene)-2-thioxo-4-thiazolidinone (**2c**).

This compound has mp 276-278 °C; yield 2.20 g (93%); (lit [22] mp 275-285 °C, yield 84%); ir: NH 3194, CO 1727, CS 1228 cm^{-1}; ^{1}H nmr(DMSO-d_6): δ 6.95, 7.46 (2d, *J* = 8.5 Hz, 4H, Ar-H), 7.56 (s, 1H, =CH), 10.43 (s, 1H, OH), 13.66 (s, 1H, NH); ^{13}C nmr(DMSO-d_6): δ), 116.76, 121.19, 124.19, 125.79, 132.65, 160.60 (=CH, C-5, C-Ar), 169.70 (C-4), 195.69 (C-2); EI ms: *m/z* = 237 (M^+).

5-((*Z*)-4-Hydroxy-3-methoxybenzylidene)-2-thioxo-4-thiazolidinone (**2d**).

This compound has mp 194-196 °C; yield 2.30 g (86%) (lit [23] mp 239-240 °C, yield 67%); ir: NH 3190, CO 1728, CS 1226 cm^{-1}; ^{1}H nmr(DMSO-d_6): δ 3.86 (OMe), 6.86-7.15 (m, 3H, Ar-H), 7.94 (s, 1H, =CH), 9.90 (s, 1H, OH), 13.72 (s, 1H, NH); ^{13}C nmr (DMSO-d_6): δ 56.23 (OMe), 124.70 (=CH), 114.43, 119.99, 120.45, 120.50, 127.20, 147.19, 148.26 (C-5, C-Ar), 170.10 (C-4), 196.43 (C-2); EI ms: *m/z* = 267 (M^+).

5-((*Z*)-2-Thienylidene)-2-thioxo-4-thiazolidinone (**2e**).

This compound has mp 218-220 °C; yield 2.02 g (89%) (lit [20] mp 213-214 °C, yield 93%); ir: NH 3198, CO 1727, CS 1225 cm^{-1}; ^{1}H nmr (DMSO-d_6): δ 7.27 (d, *J* = 3.8 Hz, 1H, 4'-H), 7.68 (t, *J* = 3.7 Hz, 1H, 3'-H), 7.90 (d, *J* = 3.8 Hz, 1H, 5'-H), 8.03 (s, 1H, =CH), 13.77 (s, 1H, NH); ^{13}C nmr (DMSO-d_6): δ 123.11, 124.86, 129.37, 134.37, 135.44, 137.56 (=CH, C-5, C-Ar), 169.11 (C-4), 194.68 (C-2).

5-((*Z*)-2-Furylidene)-2-thioxo-4-thiazolidinone (**2f**).

This compound has mp 229-231 °C; yield 1.73 g (82%) (lit [20] mp 232-233 °C, yield 97%); ir: NH 3190, CO 1724, CS 1225 cm^{-1}; ^{1}H nmr (DMSO-d_6): δ 6.67 (q, *J* = 3.4 Hz, 1H, 4'-H), 7.16 (t, *J* = 3.8 Hz, 1H, 3'-H), 7.48 (d, *J* = 4.0 Hz, 1H, 5'-H), 8.09

(s, 1H, =CH), 13.68 (s, 1H, NH); ^{13}C nmr (DMSO-d_6): δ 114.08, 117.86, 120.02, 122.66, 148.46, 149.63 (=CH, C-5, C-Ar), 169.20 (C-4), 196.68 (C-2).

2-Methylmercapto-4-thiazolidinone (**3**).

2-Thioxo-4-thiazolidinone (**1**) (1.33 g, 10 mmol) were dissolved in aqueous NaOH (2%, 25 mL) at room temperature. To this solution methyl iodide (1.56 g, 11 mmol) was added, and the reaction mixture was stirred overnight at room temperature. The reaction mixture was diluted with CH_2Cl_2, washed with cold saturated aqueous $NaHCO_3$ and water, and dried over anhydrous Na_2SO_4. The CH_2Cl_2 was evaporated till dryness and the residue was crystallized from methanol to yield 1.26 g (86%), mp 72-74 °C (lit [24] mp 170 °C); ir: CO 1717 cm^{-1}; ^{1}H nmr ($CDCl_3$): δ 2.75 (s, 3H, Me), 4.05 (s, 2H, 5-H); ^{13}C NMR ($CDCl_3$): δ 15.89 (Me), 39.44 (C-5), 187.10 (C-4), 202.46 (C-2); EI ms: *m/z* = 147 (M^+).

Anal. Calcd. for $C_4H_5NOS_2$ (147.22): C, 32.63; H, 3.42; N, 9.51. Found: C, 32.45; H, 3.52; N, 9.70.

5-((*Z*)-Arylidene)-2-alkylmercapto-4-thiazolidinones (**4a-f**).

Method A.

5-((Z)-Arylidene)-2-thioxo-4-thiazolidinones (**2a-f**) (10 mmol) were dissolved in aqueous NaOH (2%, 25 mL) at room temperature. To this solution allyl or methyl iodides (11 mmol) was added, and the reaction mixture was stirred overnight at room temperature. The yellow solid that separated was collected by filtration and recrystallized from methanol to give the products **4a-f**.

5-((*Z*)-Benzylidene)-2-allylmercapto-4-thiazolidinone (**4a**).

This compound has mp 83-85 °C; yield 2.14 g (82%); ir: CO 1707 cm^{-1}; ^{1}H nmr(deuteriochloroform): δ 4.06 (d, *J* = 7.1 Hz, 2H, 3-H allyl), 5.23-5.43 (m, 2H, 1-H allyl), 5.91-6.02 (m, 1H, 2-H allyl), 7.41-7.49 (m, 5H, Ar-H), 7.84 (s, 1H, =CH); ^{13}C nmr (deuteriochloroform): δ 36.15 (C-3 allyl), 120.38, 126.15, 129.20, 130.43, 130.70, 130.85, 133.43, 135.92 (C-2 allyl, =CH, C-1 allyl, C-5, C-Ar), 179.85 (C-4), 191.79 (C-2); EI ms: *m/z* = 261 (M^+).

Anal. Calcd. for $C_{13}H_{11}NOS_2$ (261.36): C, 59.74; H, 4.24; N, 5.36. Found: C, 59.48; H, 4.40; N, 5.32.

5-((*Z*)-4-Methoxylbenzylidene)-2-allylmercapto-4-thiazolidinone (**4b**).

This compoundhas mp 154-156 °C; yield 2.44 g (84%); ir: CO 1709 cm^{-1}; ^{1}H nmr (deuteriochloroform): δ 3.86 (s, 3H, OMe), 4.05 (d, *J* = 7.1 Hz, 2H, 3-H allyl), 5.22-5.44 (m, 2H, 1-H allyl), 5.92-6.03 (m, 1H, 2-H allyl), 6.99, 7.46 (2d, J = 8.68 Hz, 4H, Ar-H), 7.83 (s, 1H, =CH); ^{13}C nmr (deuteriochloroform): δ 36.02 (C-3 allyl), 55.45 (OMe), 114.75, 120.22, 123.33, 125.81, 126.09, 130.95, 132.50, 136.04, 161.65 (C-2 allyl, =CH, C-1 allyl, C-5, C-Ar), 180.17 (C-4), 190.94 (C-2); EI ms: *m/z* = 291 (M^+).

Anal. Calcd. for $C_{14}H_{13}NO_2S_2$ (291.39): C, 57.71; H, 4.50; N, 4.81. Found: C, 57.63; H, 4.68; N, 5.04.

5-((*Z*)-4-Hydroxybenzylidene)-2-methylmercapto-4-thiazolidinone (**4c**).

This compoundhas mp 170-172 °C; yield 1.96 g (78%); ir: CO 1707 cm^{-1}; ^{1}H nmr (deuteriochloroform): δ 2.81 (s, 3H, Me), 6.95, 7.52 (2d, *J* = 8.1 Hz, 4H, Ar-H), 7.74 (s, 1H, =CH), 10.48 (s, 1H, OH); ^{13}C nmr (deuteriochloroform): δ 15.58 (Me), 122.11 (=CH), 124.32 (C-5), 116.70, 133.20, 135.98, 160.75 (C-Ar), 179.55 (C-4), 192.21 (C-2); EI ms: *m/z* = 251 (M^+).

Anal. Calcd. for $C_{11}H_9NO_2S_2$ (251.33): C, 52.57; H, 3.61; N, 5.57. Found: C, 52.29; H, 3.80; N, 5.36.

5-((*Z*)-2-Hydroxy-3-methoxybenzylidene)-2-methylmercapto-4-thiazolidinone (**4d**).

This compound has mp 199-201 °C; yield 2.31 g (82%); ir: CO 1710 cm^{-1}; ^{1}H nmr (DMSO-d_6): δ 2.82 (s, 3H, Me), 3.86 (s, 3H, OMe), 6.92-7.12 (m, 3H, Ar-H), 8.13 (s, 1H, =CH), 9.84 (s, 1H, OH); ^{13}C nmr ($CDCl_3$): δ 15.30 (Me), 55.95 (OMe), 119.62 (=CH), 124.93 (C-5), 114.26, 119.86, 120.36, 130.11, 147.17, 148.00 (C-Ar), 179.11 (C-4), 192.88 (C-2); EI ms: *m/z* = 281 (M^+).

Anal. Calcd. for $C_{12}H_{11}NO_3S_2$ (281.35): C, 52.23; H, 3.94; N, 4.98. Found: C, 52.05; H, 4.20; N, 4.74.

2-Allylmercapto-5-((*Z*)-2-thienylidene)-4-thiazolidinone (**4e**).

This compound has mp 100-102 °C; yield 2.14 g (80%); ir: CO 1712 cm^{-1}; ^{1}H nmr (DMSO-d_6): δ 4.09 (d, *J* = 6.9 Hz, 2H, 3-H allyl), 5.26, 5.40 (2d, *J* = 10.0, 16.9 Hz, 2H, 1-H allyl), 5.92-6.05 (m, 1H, 2-H allyl), 7.17 (t, *J* = 4.3 Hz, 1H, 4'-H), 7.68 (d, *J* = 3.0 Hz, 1H, 3'-H), 7.90 (d, *J* = 4.6 Hz, 1H, 5'-H), 8.01 (s, 1H, =CH); ^{13}C nmr (DMSO-d_6): δ 36.23 (C-3 allyl), 120.37, 124.81, 125.87, 128.17, 128.88, 130.92, 132.34, 133.86, 138.83 (C-2 allyl, =CH, C-1 allyl, C-5, C-Ar), 179.64 (C-4), 190.33 (C-2); EI ms: *m/z* = 267 (M^+).

Anal. Calcd. for $C_{11}H_9NOS_3$ (267.39): C, 49.41; H, 3.39; N, 5.24. Found: C, 49.12; H, 3.57; N, 5.50.

5-((*Z*)-2-Furylidene)-2-allylmercapto-4-thiazolidinone (**4f**).

This compound has mp 72-74 °C; yield 2.27 g (90%); ir: CO 1714 cm^{-1}; ^{1}H nmr (DMSO-d_6): δ 4.08 (d, *J* = 7.0 Hz, 2H, 3-H allyl), 5.27, 5.42 (2d, *J* = 9.7, 18.1 Hz, 2H, 1-H allyl), 5.94-6.03 (m, 1H, 2-H allyl), 6.58 (q, *J* = 1.8 Hz, 1H, 4'-H), 6.83 (d, *J* = 3.5 Hz, 1H, 3'-H), 7.60 (s, 1H, =CH), 7.67 (d, *J* = 1.7 Hz, 1H, 5'-H); ^{13}C nmr (DMSO-d_6): δ 113.50, 118.60, 120.25, 121.20, 124.24, 131.01, 146.71, 149.81 (C-2 allyl, =CH, C-1 allyl, C-5, C-Ar), 179.78 (C-4), 192.28 (C-2); EI ms: *m/z* = 251 (M^+).

Anal. Calcd. for $C_{11}H_9NO_2S_2$ (251.33): C, 52.57; H, 3.61; N, 5.57. Found: C, 52.34; H, 3.50; N, 5.72.

Method B.

A mixture of **3** (147 mg, 1 mmol), 4-hydroxybenzaldehyde (122 mg, 1 mmol) and morpholine (87 µL, 1.1 mmol) in an hydrous ethanol (3 mL) was stirred for 12 h until the starting material was consumed (tlc). The reation mixture was diluted with water and then neutralized with 1*M* HCl. The yellow solid separated was collected by filtration and recrystallized from ethanol to give the product **4c** in 88% yield.

2-(4-Oxo-thiazolidin-2-ylideneamino)benzoic Acids (**6a,b**).

A mixture of 2-methylmercapt-4-thiazolidinone (**3**) (1.47 g, 10 mmol) and the appropriate 2-aminobenzoic acids (10 mmol) in anhydrous ethanol (30 mL) was heated under reflux for 24 h until the starting material was consumed (tlc). The yellow solid separated was collected by filtration and recrystallized from dimethylformamide to give the products **6a,b**.

2-(4-Oxo-thiazolidin-2-ylideneamino)benzoic Acid (**6a**).

This compound has mp 190-192 °C; yield 1.50 g (63%) (lit [17] mp 187-189 °C, yield 54%); ir: NH 3280, CO 1778, CO 1719 cm^{-1}; ^{1}H nmr (DMSO-d_6): δ 4.01 (s, 2H, 5-H), 7.05 (br. s, 1H, COOH), 7.23 (t, *J* = 7.5 Hz, 2H, Ar-H), 7.56 (t, *J* = 7.3 Hz, 1H, Ar-H), 7.87 (d, *J* = 7.6 Hz, 1H, Ar-H), 12.42 (br. s, 1H, NH); EI ms: *m/z* = 236 (M^+).

2-(4-Oxo-thiazolidin-2-ylideneamino)-4,5-dimethoxybenzoic acid (**6b**).

This compoundhas mp 231-233 °C; yield 2.84 g (96%); ir: NH 3286, CO 1780, CO 1717 cm^{-1}; ^1H nmr(DMSO-d_6): δ 3.83, 3.87 (2s, 6H, 2 OMe), 4.33 (s, 2H, 5-H), 6.73 (s, 1H, Ar-H), 7.47 (br. s, 1H, COOH), 8.09 (s, 1H, Ar-H), 12.15 (br. s, 1H, NH); EI ms: *m/z* = 296 (M^+).

Anal. Calcd. for $C_{12}H_{12}N_2O_5S$ (296.30): C, 48.64; H, 4.08; N, 9.45. Found: C, 48.32; H, 4.35; N, 9.48.

5*H*-Thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-diones (**7a,b**).

To a mixture of 2-(2-carboxyphenylimino)-4-thiazolidinones (**6a,b**) (2 mmol) acetic anhydride (6 mL) was heated under reflux for 2 h until the starting material was consumed (tlc). The reaction mixture was poured into cold water. The yellow solid separated was collected by filtration and recrystallized from dimethylformamide to give the products **7a,b**.

5*H*-Thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**7a**).

This compound has mp 296-298 °C; yield 366 mg (84%) (lit [17] mp 293-295 °C, yield 50%); ir: CO 1709, CO 1678 cm^{-1}; ^1H nmr (DMSO-d_6): δ 4.10 (s, 2H, CH_2), 7.35-8.21 (m, 4H, Ar-H); EI ms: *m/z* = 218 (M^+).

7,8-Dimethoxy-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**7b**).

This compound has mp 258-260 °C; yield 456 mg (82%); ir: CO 1710, CO 1674 cm^{-1}; ^1H nmr (DMSO-d_6): δ 3.90, 3.92 (2s, 6H, 2 OCH_3), 4.03 (s, 2H, CH_2), 6.96, 8.38 (2s, 2H, Ar-H); EI ms: *m/z* = 278 (M^+).

Anal. Calcd. for $C_{12}H_{10}N_2O_4S$ (278.28): C, 51.79; H, 3.62; N, 10.07. Found: C, 52.12; H, 3.70; N, 9.86.

2-(5-Arylidene-4-oxo-thiazolidin-2-ylideneamino)benzoic Acids (**8a-o**).

A mixture of 5-((*Z*)-arylidene)-2-alkylmercapt-4-thiazolidinones (**4a-f**) (5 mmol) and the appropriate 2-aminobenzoic acids (**5a-e**, 5 mmol) in anhydrous ethanol (30 mL) was heated under reflux for 24 h until the starting material was consumed (tlc). The yellow solid separated was collected by filtration and recrystallized from dimethylformamide to give the products **8a-o**.

2-(5-Benzylidene-4-oxo-thiazolidin-2-ylideneamino)benzoic Acid (**8a**).

This compound has mp 233-235 °C; yield 1.39 g (86%); ir: NH 3282, CO 1776, CO 1720 cm^{-1}; ^1H nmr (DMSO-d_6): δ 7.06 (br. s, 1H, COOH), 7.66 (s, 1H, =CH), 7.26-7.90 (m, 9H, Ar-H), 12.68 (br. s, 1H, NH); ^{13}C NMR (DMSO-d_6): δ 122.33-147.66 (=CH, C-5, C-Ar), 166.92 (C-2), 167.47 (C-4); EI ms: *m/z* = 324 (M^+).

Anal. Calcd. for $C_{17}H_{12}N_2O_3S$ (324.35): C, 62.95; H, 3.73; N, 8.64. Found: C, 62.70; H, 3.92; N, 8.76.

2-(5-(4-Methoxybenzylidene)-4-oxo-thiazolidin-2-ylideneamino)benzoic Acid (**8b**).

This compoundhas mp 234-236 °C; yield 1.31 g (74%); ir: NH 3286, CO 1778, CO 1722 cm^{-1}; ^1H nmr (DMSO-d_6): δ 3.77 (s, 3H, OCH_3), 6.95-7.91 (m, 10H, COOH, =CH, Ar-H), 12.55 (br. s, 1H, NH); EI ms: *m/z* = 354 (M^+).

Anal. Calcd. for $C_{18}H_{14}N_2O_4S$ (354.38): C, 61.01; H, 3.98; N, 7.90. Found: C, 60.88; H, 4.26; N, 7.74.

2-(5-(4-Hydroxybenzylidene)-4-oxo-thiazolidin-2-ylideneamino)benzoic Acid (**8c**).

This compound has mp >300 °C; yield 0.9 g (53%); ir: NH 3280, CO 1778, CO 1717 cm^{-1}; ^1H nmr (DMSO-d_6): δ 6.85-7.93 (m, 10H, COOH, =CH, Ar-H), 10.19 (s, 1H, OH), 12.61 (br. s, 1H, NH); EI ms: *m/z* = 340 (M^+).

Anal. Calcd. for $C_{17}H_{12}N_2O_4S$ (340.35): C, 59.99; H, 3.55; N, 8.23. Found: C, 59.73; H, 3.80; N, 8.06.

2-(5-(4-Hydroxy-3-methoxybenzylidene)-4-oxo-thiazolidin-2-ylideneamino)benzoic Acid (**8d**).

This compoundhas mp 217-219 °C; yield 1.45 g (78%); ir: NH 3286, CO 1786, CO 1722 cm^{-1}; ^1H nmr (DMSO-d_6): δ 3.82 (s, 3H, OCH_3), 6.84, 7.02, 7.88 (3d, J = 6.36 Hz, 4H, Ar-H), 7.93 (s, 1H, =CH), 9.58 (s, 1H, OH), 12.64 (br. s, 1H, NH); EI ms: *m/z* = 370 (M^+).

Anal. Calcd. for $C_{18}H_{14}N_2O_5S$ (370.38): C, 58.37; H, 3.81; N, 7.56. Found: C, 58.17; H, 3.92; N, 7.60.

2-(4-Oxo-5-(2-thienylidene)-thiazolidin-2-ylideneamino)benzoic Acid (**8e**).

This compoundhas mp 255-257 °C; yield 1.20 g (73%); ir: NH 3280, CO 1782, CO 1718 cm^{-1}; ^1H nmr (DMSO-d_6): δ 7.06 (br. s, 1H, COOH), 7.12-7.87 (m, 7H, Ar-H), 7.91 (s, 1H, =CH), 12.63 (br. s, 1H, NH); EI ms: *m/z* = 330 (M^+).

Anal. Calcd. for $C_{15}H_{10}N_2O_3S_2$ (330.38): C, 54.53; H, 3.05; N, 8.48. Found: C, 54.28; H, 3.25; N, 8.40.

2-(5-(2-Furylidene)-4-oxo-thiazolidin-2-ylideneamino)benzoic Acid (**8f**).

This compoundhas mp 282-284 °C; yield 1.35 g (86%); ir: NH 3286, CO 1780, CO 1717 cm^{-1}; ^1H nmr(DMSO-d_6): δ 6.49-7.88 (m, 8H, Ar-H, COOH, =CH), 12.31 (br. s, 1H, NH); EI ms: *m/z* = 314 (M^+).

Anal. Calcd. for $C_{15}H_{10}N_2O_4S$ (314.32): C, 57.32; H, 3.21; N, 8.91. Found: C, 57.27; H, 3.46; N, 8.59.

2-(5-(4-Methoxybenzylidene)-4-oxo-thiazolidin-2-ylideneamino)-4,5-dimethoxybenzoic acid (**8g**).

This compoundhas mp 265-267 °C; yield 1.70 g (82%); ir: NH 3290, CO 1778, CO 1722 cm^{-1}; ^1H nmr (DMSO-d_6): δ 3.76, 3.81, 3.84 (s, 9H, 3 OCH_3), 6.58 (s, 1H, =CH), 6.92-7.65 (m, 7H, COOH, Ar-H), 12.25 (br. s, 1H, NH); EI ms: *m/z* = 414 (M^+).

Anal. Calcd. for $C_{20}H_{18}N_2O_6S$ (414.43): C, 57.96; H, 4.38; N, 6.76. Found: C, 57.86; H, 4.70; N, 6.72.

2-(5-(2-Hydroxy-3-methoxybenzylidene)-4-oxo-thiazolidin-2-ylideneamino)-4,5-dimethoxybenzoic acid (**8h**).

This compound has mp 298-300 °C; yield 1.80 g (84%); ir: NH 3284, CO 1780, CO 1720 cm^{-1}; ^1H nmr(DMSO-d_6): δ 3.84, 3.86 (2s, 6H, 2 OCH_3), 6.61-8.20 (m, 6H, Ar-H, =CH), 9.42 (s, 1H, OH), 12.36 (br. s, 1H, NH); EI ms: *m/z* = 430 (M^+).

Anal. Calcd. for $C_{20}H_{18}N_2O_7S$ (430.43): C, 55.81; H, 4.22; N, 6.51. Found: C, 55.54; H, 4.36; N, 6.70.

2-(4-Oxo-5-(2-thienylidene)-thiazolidin-2-ylideneamino)-4,5-dimethoxybenzoic aAcid (**8i**).

This compoundhas mp 296-298 °C; yield 1.52 g (73%); ir: NH 3282, CO 1776, CO 1717 cm^{-1}; ^1H nmr(DMSO-d_6): δ 3.82, 3.84 (s, 6H, 2 OCH_3), 6.59-7.82 (m, 7H, COOH, =CH, Ar-H), 12.31 (br. s, 1H, NH); EI ms: *m/z* = 390 (M^+).

Anal. Calcd. for $C_{17}H_{14}N_2O_5S_2$ (390.44): C, 52.30; H, 3.61; N, 7.17. Found: C, 52.18; H, 3.90; N, 7.23.

2-(5-Benzylidene-4-oxo-thiazolidin-2-ylideneamino)-4-bromobenzoic Acid (**8j**).

This compoundhas mp 246-248 °C; yield 1.45 g (72%); ir: NH 3286, CO 1780, CO 1717 cm^{-1}; ^1H nmr (DMSO-d_6): δ 7.12 (br. s, 1H, COOH), 7.67 (s, 1H, =CH), 7.42-8.32 (m, 8H, Ar-H), 12.80 (br. s, 1H, NH); EI ms: *m/z* = 403 (M^+).

Anal. Calcd. for $C_{17}H_{11}BrN_2O_3S$ (403.25): C, 50.63; H, 2.75; N, 6.95. Found: C, 50.45; H, 3.02; N, 6.68.

2-(5-(2-Furylidene)-4-oxo-thiazolidin-2-ylideneamino)-4-bromobenzoic Acid (**8k**).

This compoundhas mp 274-276 °C; yield 1.40 g (72%); ir: NH 3284, CO 1780, CO 1719 cm^{-1}; ^1H nmr (DMSO-d_6): δ 6.52-7.80 (m, 8H, COOH, =CH, Ar-H), 12.61 (br. s, 1H, NH); EI ms: *m/z* = 393 (M^+).

Anal. Calcd. for $C_{15}H_9BrN_2O_4S$ (393.21): C, 45.82; H, 2.31; N, 7.12. Found: C, 45.47; H, 2.16; N, 6.96.

2-(5-Benzylidene-4-oxo-thiazolidin-2-ylideneamino)-4-chlorobenzoic Acid (**8l**).

This compoundhas mp 234-236 °C; yield 1.15 g (64%); ir: NH 3284, CO 1776, CO 1718 cm^{-1}; ^1H nmr (DMSO-d_6): δ 7.11 (br. s, 1H, COOH), 7.83 (s, 1H, =CH), 7.41-7.90 (m, 8H, Ar-H), 12.85 (br. s, 1H, NH); EI ms: *m/z* = 358 (M^+).

Anal. Calcd. for $C_{17}H_{11}ClN_2O_3S$ (358.80): C, 56.91; H, 3.09; N, 7.81. Found: C, 56.70; H, 3.34; N, 7.56.

2-(5-(4-Methoxybenzylidene)-4-oxo-thiazolidin-2-ylideneamino)-4-chlorobenzoic Acid (**8m**).

This compoundhas mp 272-274 °C; yield 1.40 g (72%); ir: NH 3282, CO 1779, CO 1717 cm^{-1}; ^1H nmr (DMSO-d_6): δ 3.78 (s, 3H, OCH_3), 7.02-7.84 (m, 9H, COOH, =CH, Ar-H), 12.67 (br. s, 1H, NH); ^{13}C nmr (DMSO-d_6): δ 55.74 (OCH_3), 115.17, 124.91, 126.04, 128.82, 130.18, 130.66, 132.04, 133.13, 160.96 (C-Ar, =CH, C-5), 166.25 (C-2), 167.50 (C-4); EI ms: *m/z* = 388 (M^+).

Anal. Calcd. for $C_{18}H_{13}ClN_2O_4S$ (388.83): C, 55.60; H, 3.37; N, 7.20. Found: C, 55.36; H, 3.60; N, 7.45.

2-(5-(2-Furylidene)-4-oxo-thiazolidin-2-ylideneamino)-4-chlorobenzoic Acid (**8n**).

This compoundhas mp 268-270 °C; yield 1.15 g (66%); ir: NH 3280, CO 1778, CO 1720 cm^{-1}; ^1H nmr(DMSO-d_6): δ 6.58-7.83 (m, 8H, COOH, =CH, Ar-H), 12.62 (br. s, 1H, NH); EI ms: *m/z* = 348 (M^+).

Anal. Calcd. for $C_{15}H_9ClN_2O_4S$ (348.76): C, 51.66; H, 2.60; N, 8.03. Found: C, 51.50; H, 2.79; N, 7.96.

2-(4-Oxo-5-(2-thienylidene)-thiazolidin-2-ylideneamino)-3-chlorobenzoic Acid (**8o**).

This compoundhas mp 277-279 °C; yield 1.00 g (56%); ir: NH 3282, C=O 1778, C=O 1719 cm^{-1}; ^1H nmr (DMSO-d_6): δ 7.09-7.94 (m, 7H, COOH, Ar-H), 8.02 (s, 1H, =CH), 12.64 (br. s, 1H, NH); ^{13}C nmr (DMSO-d_6): δ 119.81, 120.31, 123.70, 125.45, 129.04, 129.78, 131.20, 132.56, 134.09, 137.54, 146.55 (C-Ar, =CH, C-5), 166.59 (C-2), 167.21 (C-4); EI ms: *m/z* = 364 (M^+).

Anal. Calcd. for $C_{15}H_9ClN_2O_3S_2$ (364.83): C, 49.38; H, 2.49; N, 7.72. Found: C, 49.22; H, 2.60; N, 7.46.

2-(Arylidene)-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-diones (**9a-o**). Method A.

To a mixture of 2-(5-arylidene-4-oxo-thiazolidin-2-ylideneamino)benzoic acids (**8a-o**) (1 mmol), acetic anhydride (3 mL) was heated under reflux for 2 h until the starting material was consumed (tlc). The reaction mixture was poured into cold water. The yellow solid that separated was collected by filtration and recrystallized from dimethylformamide to give the products **9a-o**.

2-(Benzylidene)-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**9a**).

This compound has mp 260-262 °C; yield 250 mg (82%) (lit [18] mp 248-250 °C, yield 78%); ir: CO 1717, CO 1700 cm^{-1}; ^1H nmr (DMSO-d_6): δ 8.02 (s, 1H, =CH), 7.50-8.20 (m, 9H, Ar-H); EI ms: *m/z* = 306 (M^+).

Anal. Calcd. for $C_{17}H_{10}N_2O_2S$ (306.34): C, 66.65; H, 3.29; N, 9.14. Found: C, 66.92; H, 3.54; N, 8.96.

2-(4-Methoxybenzylidene)-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**9b**).

This compound has mp 232-234 °C; yield 289 mg (86%) (lit [18] mp 230-232 °C, yield 75%); ir: CO 1710, CO 1682 cm^{-1}; ^1H nmr (deuteriochloroform): δ 3.88 (s, 3H, OCH_3), 7.04-8.34 (m, 9H, Ar-H, =CH); EI ms: *m/z* = 336 (M^+).

2-(4-Acetoxybenzylidene)-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**9c**).

This compound has mp 255-257 °C; yield 353 mg (97%); ir: Ac 1750, CO 1712, CO 1676 cm^{-1}; ^1H nmr (DMSO-d_6): δ 2.36 (s, 3H, Ac), 7.20-8.05 (m, 9H, =CH, Ar-H); EI ms: *m/z* = 364 (M^+).

Anal. Calcd. for $C_{19}H_{12}N_2O_4S$ (364.38): C, 62.63; H, 3.32; N, 7.69. Found: C, 62.40; H, 3.56; N, 7.56.

2-(2-Acetoxy-3-methoxybenzylidene)-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**9d**).

This compound has mp 240-242 °C; yield 382 mg (97%); ir: Ac 1752, CO 1712, CO 1682 cm^{-1}; ^1H nmr (DMSO-d_6): δ 2.38 (s, 3H, Ac), 3.83 (s, 3H, OCH_3), 7.20-8.19 (m, 8H, =CH, Ar-H); ^{13}C nmr (DMSO-d_6): δ 20.05 (Ac), 56.14 (OCH_3), 115.12, 119.52, 120.10, 122.60, 125.89, 126.19, 126.75, 127.23, 127.31, 127.42, 135.95, 138.60, 146.04, 151.43, 152.42 (C-Ar, =CH, C-2), 157.63 (C-5), 162.39 (C-3), 168.19 (Ac); EI ms: *m/z* = 394 (M^+).

Anal. Calcd. for $C_{20}H_{14}N_2O_5S$ (394.40): C, 60.91; H, 3.58; N, 7.10. Found: C, 60.67; H, 3.80; N, 7.22.

2-(2-Thienylidene)-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**9e**).

This compoundhas mp 278-280 °C; yield 271 g (87%); ir: CO 1708, CO 1690 cm^{-1}; ^1H nmr (deuteriochloroform): δ 7.22-8.23 (m, 8H, =CH, Ar-H); EI ms: *m/z* = 312 (M^+).

Anal. Calcd. for $C_{15}H_8N_2O_2S_2$ (312.37): C, 57.68; H, 2.58; N, 8.97. Found: C, 57.55; H, 2.50; N, 8.73.

2-(2-Furylidene)-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**9f**).

This compound has mp 280-282 °C; yield 263 mg (89%); ir: CO 1708, CO 1675 cm^{-1}; ^1H nmr (DMSO-d_6): δ 6.80-8.20 (m, 8H, =CH, Ar-H); EI ms, *m/z* = 296 (M^+).

Anal. Calcd. for $C_{15}H_8N_2O_3S$ (296.30): C, 60.80; H, 2.72; N, 9.45. Found: C, 60.56; H, 2.64; N, 9.58.

2-(4-Methoxbenzylidene)-7,8-dimethoxy-5*H*-thiazolo[2,3-*b*]-quinazoline-3,5(2*H*)-dione (**9g**).

This compound has mp 276-278 °C; yield 325 mg (82%); ir: CO 1717, CO 1690 cm^{-1}; ^1H nmr($CDCl_3$): δ 3.88 (s, 3H, OCH_3), 4.00 (s, 6H, 2 OCH_3), 7.00-8.0 (m, 7H, =CH, Ar-H); EI ms: *m/z* = 396 (M^+).

Anal. Calcd. for $C_{20}H_{16}N_2O_5S$ (396.42): C, 60.60; H, 4.07; N, 7.07. Found: C, 60.52; H, 4.24; N, 6.86.

2-(2-Acetoxy-3-methoxybenzylidene)-7,8-dimethoxy-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**9h**).

This compound has mp 281-283 °C; yield 427 mg (94%); ir: Ac 1754, CO 1710, CO 1690 cm^{-1}; ^1H nmr (DMSO-d_6): δ 2.38 (s, 3H, Ac), 3.86, 3.92, 3.95 (3s, 9H, 3 OCH_3), 6.87-8.50 (m, 6H, =CH, Ar-H); EI ms: *m/z* = 454 (M^+).

Anal. Calcd. for $C_{22}H_{18}N_2O_7S$ (454.45): C, 58.14; H, 3.99; N, 6.16. Found: C, 58.05; H, 4.13; N, 6.24.

7,8-Dimethoxy-2-(2-thienylidene)-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**9i**).

This compound has mp >300 °C; yield 357 mg (96%); ir: CO 1710, CO 1686 cm^{-1}; ^1H nmr (deuteriochloroform): δ 4.07, 4.08 (2s, 6H, 2 OCH_3), 7.25 (s, 1H, =CH), 7.35-8.50 (m, 5H, Ar-H); EI ms: *m/z* = 372 (M^+).

Anal. Calcd. for $C_{17}H_{12}N_2O_4S_2$ (372.42): C, 54.83; H, 3.25; N, 7.52. Found: C, 54.58; H, 3.34; N, 7.68.

2-(Benzylidene)-7-bromo-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**9j**).

This compound has mp 146-148 °C; yield 362 mg (94%) (lit [17] mp 95-97 °C, yield 67%); ir: CO 1712, CO 1686 cm^{-1}; ^1H nmr ($CDCl_3$): δ 8.15 (s, 1H, =CH), 7.46-8.35 (m, 8H, Ar-H); EI ms: *m/z* = 385 (M^+).

Anal. Calcd. for $C_{17}H_9BrN_2O_2S$ (385.24): C, 53.00; H, 2.35; N, 7.27. Found: C, 53.20; H, 2.61; N, 7.04.

7-Bromo-2-(2-furylidene)-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**9k**).

This compoundhas mp 290-292 °C; yield 367 g (98%); ir: CO 1710, C=O 1682 cm^{-1}; ^1H nmr (deuteriochloroform): δ 6.76-8.48 (m, 7H, Ar-H, =CH); EI ms: *m/z* = 375 (M^+).

Anal. Calcd. for $C_{15}H_7BrN_2O_3S$ (375.20): C, 48.02; H, 1.88; N, 7.47. Found: C, 47.90; H, 2.21; N, 7.36.

2-(Benzylidene)-7-chloro-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**9l**).

This compound has mp 264-266 °C; yield 299 mg (88%) (lit [17] mp 100-102 °C, yield 48%); ir: CO 1711, CO 1678 cm^{-1}; ^1H nmr (DMSO-d_6): δ 8.10 (s, 1H, =CH), 7.40-8.20 (m, 8H, Ar-H); EI ms: *m/z* = 340 (M^+).

Anal. Calcd. for $C_{17}H_9ClN_2O_2S$ (340.78): C, 59.92; H, 2.66; N, 8.22. Found: C, 59.63; H, 3.04; N, 8.32.

2-(4-Methoxybenzylidene)-7-chloro-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**9m**).

This compoundhas mp 278-280 °C; yield 315 mg (85%); ir: CO 1710, CO 16780 cm^{-1}; ^1H nmr(deuteriochloroform): δ 3.97 (s, 3H, OCH_3), 7.14-8.37 (m, 8H, Ar-H, =CH); EI ms: *m/z* = 370 (M^+).

Anal. Calcd. for $C_{18}H_{11}ClN_2O_3S$ (370.81): C, 58.30; H, 2.99; N, 7.55. Found: C, 58.54; H, 3.15; N, 7.58.

7-Chloro-2-(2-furylidene)-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**9n**).

This compound has mp 280-282 °C; yield 307 mg (93%), ir: CO 1712, CO 1670 cm^{-1}; ^1H nmr (deuteriochloroform): δ 6.76-8.33 (m, 7H, Ar-H, =CH); EI ms: *m/z* = 330 (M^+).

Anal. Calcd. for $C_{15}H_7ClN_2O_3S$ (330.75): C, 54.47; H, 2.13; N, 8.47. Found: C, 54.43; H, 2.40; N, 8.56.

6-Chloro-2-(2-thienylidene)-5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**9o**).

This compound has mp 299-301 °C; yield 256 mg (74%); ir: CO 1708, CO 1676 cm^{-1}; ^1H nmr (deuteriochloroform): δ 7.34-8.45 (m, 7H, Ar-H, =CH); EI ms: *m/z* = 346 (M^+).

Anal. Calcd. for $C_{15}H_7ClN_2O_2S_2$ (346.81): C, 51.95; H, 2.03; N, 8.08. Found: C, 51.82; H, 2.30; N, 8.02.

Method B.

A mixture of 2-(4-oxo-thiazolidin-2-ylideneamino)benzoic acid (**6a**) (236 mg, 1 mmol) and benzaldehyde(117 mg, 1.1 mmol) was heated under reflux in acetic anhydride (3 mL) for 6 h until the starting material was consumed (tlc). After cooling to room temperature, the reaction mixture was poured into cold water. The yellow solid that separated was collected by filtration and recrystallized from dimethylformamide to give the product **9a** in 76% overall yield.

Method C.

To a mixture of 5*H*-thiazolo[2,3-*b*]quinazoline-3,5(2*H*)-dione (**7a**) (218 mg, 1 mmol), anhydrous sodium acetate and glacial acetic acid (3 mL) was added the benzaldehyde (117 mg, 1.1 mmol). The mixture was heated under reflux until the starting material was consumed (3 h; tlc). After cooling to room temperature, the reaction mixture was poured into cold water. The yellow solid that separated was collected by filtration and recrystallized from ethanol to give the product **9a** in 72% yield.

3-(5-Arylidene-4-oxo-thiazolidin-2-ylideneamino)naphthalene-2-carboxylic Acids (**11a,b**).

A mixture of 5-((Z)-arylidene)-2-alkylmercapto-4-thiazolidinones (**4a,c**) (5 mmol) and 3-aminonaphthoic acid (**10**) (1.03 g, 5.5 mmol) in anhydrous ethanol (30 mL) was heated under reflux for 24 h until the starting material was consumed (tlc). The yellow solid that separated was collected by filtration and recrystallized from dimethylformamide to give the products **11a,b**.

3-(5-Benzylidene-4-oxo-thiazolidin-2-ylideneamino)naphthalene-2-carboxylic Acid (**11a**).

This compound has mp 314-316 °C; yield 1.42 g (76%); ir: NH 3290, CO 1772, CO 1727 cm^{-1}; ^1H nmr(DMSO-d_6): δ 7.43-8.52 (m, 13H, COOH, =CH, Ar-H), 12.56 (br. s, 1H, NH); EI ms: *m/z* = 374 (M^+).

Anal. Calcd. for $C_{21}H_{14}N_2O_3S$ (374.41): C, 67.37; H, 3.77; N, 7.48. Found: C, 67.54; H, 4.04; N, 7.26.

3-(5-(2-Hydroxy-3-methoxybenzylidene)-4-oxo-thiazolidin-2-ylideneamino)naphthalene-2-carboxylic Acid (**11b**).

This compound has mp 277-279 °C; yield 1.85 g (88%); ir: NH 3292, CO 1770, C=O 1720 cm^{-1}; ^1H nor (DMSO-d_6): δ 3.85 (s, 3H, OCH_3), 6.77-8.52 (m, 11H, COOH, =CH, Ar-H), 9.58 (s, 1H, OH), 12.67 (br. s, 1H, NH); EI ms: *m/z* = 420 (M^+).

Anal. Calcd. for $C_{22}H_{16}N_2O_5S$ (420.44): C, 62.85; H, 3.84; N, 6.66. Found: C, 62.58; H, 3.94; N, 6.60.

2-(Arylidene)-5*H*-thiazolo[2,3-*b*]benzoquinazoline-3,5(2*H*)-diones (**12a,b**).

Method A.

To a mixture of 3-(5-arylidene-4-oxo-thiazolidin-2-ylidene-amino)naphthalene-2-carboxylic acids (**11a,b**) (1 mmol) and acetic anhydride (3 mL) was heated under reflux for 2 h until the starting material was consumed (tlc). The reaction mixture was poured into cold water. The yellow solid that separated was collected by filtration and recrystallized from dimethylformamide to give the products **12a,b**.

2-(Benzylidene)-5*H*-thiazolo[2,3-*b*]benzoquinazoline-3,5(2*H*)-dione (**12a**).

This compound has mp 322-324 °C; yield 320 mg (90%); ir: ν 1714 cm^{-1}, CO 1690 cm^{-1}; ^{1}H nmr (DMSO-d_6): δ 7.50-9.00 (m, 12H, =CH, Ar-H); ms: *m/z* = 356 (M^+).

Anal. Calcd. for $C_{21}H_{12}N_2O_2S$ (356.39): C, 70.77; H, 3.39; N, 7.86. Found: C, 70.58; H, 3.46; N, 7.80.

2-(2-Acetoxy-3-methoxybenzylidene)-5*H*-thiazolo[2,3-*b*]benzoquinazoline-3,5(2*H*)-dione (**12b**).

This compound has mp 278-280 °C; yield 395 mg (89%); ir: CO 1717, CO 1686 cm^{-1}; ^{1}H nmr(DMSO-d_6): δ 3.40 (s, 3H, Ac), 3.89 (s, 3H, OCH_3), 7.20-8.90 (m, 10H, =CH, Ar-H); EI ms: *m/z* = 444 (M^+).

Anal. Calcd. for $C_{24}H_{16}N_2O_5S$ (444.46): C, 64.86; H, 3.63; N, 6.30. Found: C, 64.69; H, 3.73; N, 6.50.

Method B.

A mixture of 5-((Z)-benzylidene)-2-allylmercapt-4-thiazolidinone (**4a**) (261 mg, 1 mmol) and 2-aminobenzoic acid (**10**) (151 mg, 1.1 mmol) was heated under reflux in glacial acetic acid (5 mL) for 6 h until the starting material was consumed (tlc). After cooling to room temperature, the reaction mixture was poured into cold water. The yellow solid that separated was collected by filtration and recrystallized from dimethylformamide to give the product **12a** in 68% overall yield.

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